

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Automation -- A Tool for Procurement		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR(s) Robert S. Young David L. Goodwin		6. PERFORMING ORG. REPORT NUMBER LMI Task RE201
9. PERFORMING ORGANIZATION NAME AND ADDRESS Logistics Management Institute, 4701 Sangamore Road, P. O. Box 9489, Washington, D. C. 20016		8. CONTRACT OR GRANT NUMBER(s) MDA903-81-C-0166
11. CONTROLLING OFFICE NAME AND ADDRESS Office of the Assistant Secretary of Defense for Research & Engineering (AM), Room 3E144, The Pentagon, Washington, D. C.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (If different from Controlling Office)		12. REPORT DATE July 1982
		13. NUMBER OF PAGES 32
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) "A" Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Automation, Procurement, Contracting, Acquisition		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) As DoD's procurement workload has continued to grow faster than its work- force, most major DoD purchasing activities have successfully introduced auto- mation into their procurement processes. This report identifies the steps in the procurement process that have been automated, and the automated systems that exist today. Also noted are major gaps, where automation is appropriate, but used only slightly. The reasons for some systems being less successful than others are dis- cussed, and recommendations are included to improve the climate for the develop- ment of future systems in DoD.		

AUTOMATION -- A TOOL FOR
PROCUREMENT

July 1982

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AUTOMATION -- A TOOL FOR PROCUREMENT

EXECUTIVE SUMMARY

Automation as a tool for procurement effectively increases productivity in three ways. First, it performs repetitive administrative tasks, thereby reducing or eliminating manual preparation of documents or the repetitive entry of data. Second, it provides for the storage and rapid retrieval of data that buyers need for transacting business and that managers need for effective control. Finally, it aids in some of the evaluative and analytic tasks required to select contractors and establish contract prices. In all instances, automation expedites the performance of required functions, reduces the opportunity for error; and in some cases it reduces the number of personnel needed to perform the tasks.

Automation has been applied in at least one purchasing office to virtually every step in the DoD procurement process. It has increased the productivity of procurement personnel by reducing manual processing time. The extent to which the process has been automated, however, varies widely. The number of innovative or experimental applications of automation is growing. Some automated procurement systems meet user resistance because they are not tailored to a user's needs or are not sufficiently responsive. Finally, the development of automated procurement systems is hampered by the lack of information exchange about what others have done and are doing with them.

As DoD's procurement workload has continued to grow faster than its workforce, most major DoD purchasing activities have successfully introduced automation into the procurement process. Successful systems tend to share common characteristics: the automated process is tailored to the specific procurement situation in which it is to be employed; systems are designed with significant participation by procurement personnel; and systems use a computer

dedicated to procurement operations to allow procurement personnel ready access.

Although automation is appropriate, it has had little use in procurement operations at some installations: the 38 bases of the Army's Forces Command and Training and Doctrine Command and the six supply centers of the Naval Supply Systems Command. Those purchasing offices processed over 1.5 million small purchase transactions in fiscal 1981. The repetitive procedures necessary to perform that huge volume of relatively simple transactions are well suited to automation. Although a few of the bases have developed automated systems and some centers have automated specific functions, most rely on manual processing. Further use of automation is warranted. We recommend a concerted effort to bring it about.

Significant duplication of cost and effort is possible in establishing automated capabilities. Analysis of automated procurement processes at 35 purchasing offices indicates that many different approaches have been followed. Many of the systems being developed and implemented are applicable to other DoD purchasing offices. Coordination of automated procurement efforts is needed; the purchasing offices need to know what others have done and are doing.

We recommend, therefore, that each major military command designate a coordinator of automated procurement applications. The coordinators will provide a means for exchange of information on experience with automation in procurement situations. The exchange should encourage new or expanded automation of procurement functions, where cost-effective, and both promote and control the introduction of new automation technologies to the DoD procurement process.

The rate of technological advancement and the demonstrated application of automation to the procurement process will justify more and more automation of DoD purchasing offices. To realize maximum benefit, procurement managers and coordinators must be active participants in the design and implementation of new procurement systems.

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1. THE PROCUREMENT PROCESS AND AUTOMATION

INTRODUCTION

Department of Defense components are having an increasingly difficult time managing and executing their procurement workload. An LMI review of DoD procurement offices in 1981 found that the workload was increasing faster than the workforce available to accomplish it.¹ This imbalance was causing a degradation in the performance of the procurement function. The review also found that many activities were using automated processes to compensate for the shortage of personnel.

Many of the automated systems being developed and implemented may be applicable to other DoD purchasing offices. The purchasing offices need to know what others have done and are doing in this field. At present there is a potential for significant duplication of cost and effort in establishing automated capabilities.

We conclude that this problem can be overcome by designating coordinators of automated procurement in the major military commands. These coordinators would provide for the exchange of information within and among the DoD components concerning their experiences with automation in various procurement situations. They would also encourage new or expanded automation of procurement functions within their commands, where cost-effective. The concept of an automation coordinator is presently being applied effectively by the Air Force Systems Command.

¹Procurement Workload versus Workforce -- A Growing Imbalance, by Robert S. Young, Richard P. White and Thomas M. O'Hern, Logistics Management Institute, Washington, D. C., May 1981.

We further conclude that there are installations where automation is warranted but lacking: the bases of the Army's Forces Command and Training and Doctrine Command and the supply centers in the Naval Supply Systems Command.

THE DoD PROCUREMENT PROCESS

Several characteristics of DoD procurements make automated procedures attractive. These include:

- Procurement is a highly labor-intensive function involving much written communication and documentation.
- There are many repetitious aspects of procurement. Frequently, the required goods or services must be described in writing three times in the course of the procurement: when the requirement is first defined by the requiring activity, when a solicitation document is prepared, and when the contract document is prepared. This applies not only to the description of the goods or services required but also to the administrative data which must accompany the transaction, such as the originator, the fund source, the purchase authority, and identification numbers. Additionally, many purchases are repetitive. Items purchased one week may be very similar, if not identical, to items purchased the previous week.
- A large volume of transactions must be processed in a limited time. For example, over 12 million contract actions were processed in fiscal 1981. Funds appropriated for the conduct of one year's business must generally be obligated (placed on contract) during that same year.
- Most procurement actions have a small dollar value and therefore are eligible for simplified purchase procedures. More than 96 percent of the transactions are for less than \$10,000. The average value of these transactions is under \$600.

DoD procurement can be divided into three categories:

- System acquisition -- the purchase of major weapon systems -- characterized by relatively few procurement actions of large dollar value.
- Central procurement -- the purchase of goods, services, or construction for the development and support of military equipment and operations -- characterized by a greater number of actions of significantly lower dollar value than expended for systems.
- Base procurement -- the purchase of goods, services, or construction to support the day-to-day operation of the local DoD installation, e.g., post, camp, station -- characterized by a great number of small dollar procurement actions.

In a general sense, however, DoD procurement is the same in all three categories. In every case a requirement must be described and conveyed to a person authorized to make the purchase. There must be a determination that funds have been authorized to cover the cost of the goods or services to be purchased. There must be contact with potential suppliers and selection of one or more sources; the reasonableness of price must be established; a document covering the transaction must be prepared, executed, and distributed to all parties concerned. Statistical data on the transaction must be entered into a data gathering system. To assure timely processing, a management information system, whether manual or automated, is needed to track the transition from requirement to contract. Thereafter, the contractor's performance must be monitored until the contract is completed.

Current data and word processor technologies are quite suitable for use in the procurement process. By its ability to process data rapidly at reasonable unit costs, and eliminate the need for repetitive data entry, automation has the potential to satisfy many needs of the procurement process: preparing solicitation and award documents, maintaining bidders lists, providing the procurement history of items to be purchased, assisting in the proper consideration of small and disadvantaged businesses, providing management information, and assisting in the analysis of complex pricing proposals.

2. FINDINGS

PROCUREMENT STEPS HAVE BEEN AUTOMATED

Review at 35 DoD procurement offices (listed in Appendix A) shows automation has been applied in one or more instances to virtually every step in the procurement process. The following list identifies the steps which have been automated. A description of each step is included as Appendix B.

1. Initiation of the purchase request
2. Identification of potential sources of supply
3. Maintenance of procurement history
4. Combination of similar requirements
5. Verification of fund availability
6. Preparation of solicitation and/or award documents
7. Evaluation of reasonableness of price
8. Performance of cost analysis
9. Gathering and reporting procurement statistics
10. Procurement tracking and management information systems
11. Updating of files
12. Surveillance of contract administration

AUTOMATION HAS INCREASED PRODUCTIVITY

Automation has increased the productivity of procurement personnel by reducing manual processing time. Automation allows the same number of personnel to process more procurement actions by processing actions faster. For example, the Automated Contract Preparation System in the Directorate of Contracting and Manufacturing at Hill Air Force Base has reduced the average document preparation time from three hours to 20 minutes, and the time from receipt of request to issuance of completed document from 12 days to one day. A word processing system at Fort Eustis (in the Army's Training and Doctrine Command) has reduced the average preparation time for a major solicitation, i.e., one for other than a small purchase, from three days to three hours. The Procurement Automated Data and Document System, used by the Army's Materiel Development and Readiness Command (DARCOM) to support central

procurement, has yielded three to five-day reductions in procurement administrative lead time (PALT).

In addition to productivity increases, there are other benefits of automation which are difficult to quantify. These include more accurate data due to less manual transcribing and shorter contract documents due to customized preparation.

EXTENT OF AUTOMATION VARIES WIDELY

The extent to which these processes have been automated varies widely among and within DoD components, and with the level of procurement. All components have well-established procedures that must be followed in purchasing ADP equipment. These procedures include a cost-benefit analysis to ensure that new equipment is cost-justified. Existing automated systems are described in Appendix C.

Some Systems Are Highly Automated

The Army's five National Inventory Control Points (NICPs) use the Procurement Automated Data and Document System (PADDS) which works in conjunction with an automated inventory management system, the Commodity Command Standard System (CCSS) for both system acquisition and central procurement.

System acquisition in the Air Force is supported by three widely used automated programs: Autopreps for drafting contracts, Acquisition Management Information System (AMIS) for transmitting contract administration data to field offices and providing information on amounts and types of contracts awarded, and Copper Impact for proposal evaluation and analysis. Central procurement in the Air Force is highly automated with an automated purchase system (JO-23) and the acquisition and due-in system (JO-41).

Central procurement at the Defense Logistics Agency (DLA) is highly automated. Its hardware centers operate under a Standard Automated Materiel

Management System (SAMMS) and its procurement component, the Automated Small Purchase System (SASPS). About 50 percent of DLA's small purchases are processed through SASPS, which is totally automated. Base support at DLA installations is almost entirely automated through use of a purchase component of DLA's Base Operations Standard System (BOSS).

Automation is Warranted but Lacking in Some Commands

The use of automation is particularly appropriate where there is a large volume of small purchase transactions, which are usually for relatively simple items and subject to simplified purchase procedures. This type of workload is typically found in central and base procurement offices. There are a few commands where automation, though warranted, is in limited use.

The purchasing functions of the 38 Army bases in the Forces Command (FORSCOM) and the Training and Doctrine Command (TRADOC) lack automated capabilities. The purchasing offices of the two commands processed over 1.1 million small purchases in fiscal 1981. Although these transactions were highly repetitive and subject to simplified purchase procedures, they were processed manually at most bases. At Fort Bragg, for example, 70,000 procurement actions under \$10,000 were processed in fiscal 1981; the only automated support was provided by three word processing machines, although a mini-computer has been requested. Three bases (Fort Hood, Fort Eustis, and Fort Belvoir) have developed automated procurement systems on their own, but there is no overall plan to standardize on one of these systems or to encourage the non-automated bases to select one for their own use. Of all the purchasing activities reviewed, the bases at these two commands were having the most difficulty coping with workload. Their plight was exemplified by purchase requisition backlogs, out-of-date source lists, and inability to monitor the progress of requisitions.

Base procurement for the Navy is accomplished primarily by the Naval Regional Contracting Offices and the Naval Supply Centers (NSCs). The six NSCs processed 400,000 procurement actions in fiscal 1981; more than 98% were under \$10,000. Automation is both necessary and appropriate, but as yet is largely undone. The NSCs are under the jurisdiction of the Naval Supply Systems Command (NAVSUP). NAVSUP has recognized the problem for a number of years, but a solution has proved elusive. A prototype automated system, Automation of Procurement and Accounting Data Entry (APADE), was implemented at NSC Oakland, but encountered serious problems. NAVSUP is now overseeing the complete redesign of APADE, and intends to install it first at NAVSUP activities, and then at all other Navy base purchasing activities, including Marine Corps bases.

Some Systems Are Outdated

The growing obsolescence of existing automated systems is another problem. Some activities that pioneered automated applications 10 or 15 years ago now have obsolete systems and need to update their equipment. There are two systems that have serious aging problems: Customer Integrated Automated Procurement System (CIAPS), used for Air Force base procurement, and Uniform Inventory Control Program (UICP), used for Navy central procurement. Both systems are characterized by equipment with insufficient capacity for present-day workloads, and designs that do not reflect modern capabilities and purchasing methods.

CIAPS suffers from a punched card, batch processing orientation with a one-day delay between a request for and receipt of information. The system operates on a central base computer (one per Air Force base). The use of the computer is shared by procurement, civil engineering, maintenance, finance, and personnel. There is no on-line access to the computer by procurement

personnel; they are limited to off-shift batch processing. Although CIAPS is being redesigned, the process will be delayed to make the system compatible with new computers to be installed at all Air Force bases.

Central procurement of goods and services to support Navy's major weapon systems is done by two offices, the Aviation Supply Office and the Ships Parts Control Center. They use an automated system, UICP, which includes an automated small purchase subsystem. Both the hardware and software are very old. The programs were designed in 1961-64, and the primary UICP computers purchased in 1968. The system lacks a number of necessary capabilities (for example, it does not have an automated bidders list, cannot maintain and extract contract clauses, and cannot produce needed management reports), and the capacity of the present equipment cannot be extended further. The Navy has a program underway to correct the problems in a series of steps: approval and procurement of new hardware, move existing application software to the new hardware by 1985, and complete redesign of all applications by the end of 1988. The situation is not uncommon: users need an enhanced or updated system immediately, but the design and implementation of such systems often take years.

EXPERIMENTAL APPLICATIONS ARE GROWING

Several examples of innovative or experimental applications of automation were found. The Defense Personnel Support Center in Philadelphia uses teleprinters to directly access computerized inventory control systems of drug manufacturers and wholesalers. They can determine the price and availability of required items, and place orders if desired. The Air Force Systems Command is experimenting with electronic interoffice transactions in selected AFSC offices. AFSC is able to monitor and control these experiments through an automation coordinator at its headquarters on Andrews Air Force Base. The Air

Logistics Center at Hill Air Force Base is testing a procedure that replaces the contract clauses for solicitations and contracts with microfiche copies of those clauses. The hard-copy document then references a clause by microfiche frame. These and other innovative applications are described more fully in Appendix C.

SOME SYSTEMS MEET USER RESISTANCE

Automated procurement systems meet user resistance from traditional sources: natural reluctance to change from manual to automated operation, anxiety about the effect of automation on job security, and skepticism brought about by poor experience with other systems.

Some systems, however, meet user resistance because the system does not help the user as much as it could. A major cause of resistance is a system that is not tailored to a user's needs. This problem frequently results from lack of involvement and input from the user in the design and implementation of the system. The problem can arise when a system designed for one purpose (e.g., inventory control) is extended to include procurement.

A second major cause of resistance is a system that is not sufficiently responsive. This lack of responsiveness can be due to obsolescence, insufficient memory capacity or processing power, or low priority on a shared computer. For example, procurement personnel at Air Force bases using CIAPS, with its punched card batch processing and severely limited computer availability, experience day-long delays between input and output. CIAPS designers are aware of its weaknesses and are presently designing its replacement.

LACK OF INFORMATION EXCHANGE HAMPERS DEVELOPMENT

The development of procurement systems is hampered by the lack of information exchange about what others have done and are doing with automated systems. Such information as characteristics of successful systems, methods

of overcoming user resistance and experiences with experimental applications would be valuable to exchange. For example, there is no direct way for someone responsible for procurement at a Marine Corps base to find out what automated systems are presently being used at other DoD bases. Even where automation is already in use, the person who wants to know how to transmit DD-350 data from a particular word processor to headquarters will have difficulty finding out if another office has solved that problem. There is a strong potential for significant duplication of cost and effort in establishing automated capabilities.

3. CONCLUSIONS AND RECOMMENDATIONS

Automation has been of significant value in DoD procurement. The most tangible benefit has been a reduction in procurement administrative lead time, resulting from faster processing of contract actions. This has allowed the same number of procurement personnel to process more procurement actions as their workload increases. Other benefits include more accurate data and shorter documents.

Most major DoD purchasing activities have successfully introduced automation into the procurement process. Successful automated systems tend to share common characteristics: the automated process is tailored to the specific procurement situation in which it is to be employed; systems are designed with significant participation by procurement personnel; and systems use a computer dedicated to procurement operations to allow procurement personnel ready access.

Although automation is appropriate, it is lacking at some purchasing offices. As detailed in the Findings, the purchasing offices with critical shortages of automation are at the Army's TRADOC and FORSCOM bases and the Navy's NSCs. Certain TRADOC and FORSCOM bases have developed or adopted one of three different automated purchase systems. We recommend that each of the remaining bases be authorized to select the one that best suits its needs and to install that system at the earliest practicable date. The Navy is currently redesigning an automated system, APADE. We recommend that this redesign be given high priority and that the resulting system be installed at the major NSCs as soon as practicable.

A framework should be provided within which automation of procurement operations can receive appropriate advocacy and in which the lessons learned by various purchasing offices can be publicized. While there are adequate procedures in all DoD components to assure the cost-effectiveness of proposed acquisitions of automation equipment, there is very little interchange of automation information among purchasing offices.

We recommend therefore that the major military commands designate coordinators of automated procurement applications. We believe that most coordinators would be individuals assuming additional rather than full time responsibilities. The coordinators should provide for exchange of information within and among the components on experiences with automation in various procurement situations, the characteristics of successful systems, and methods of overcoming user resistance. The exchange should encourage new or expanded automation of procurement functions, where cost-effective, and both promote and control the introduction of new automation technologies useful in DoD procurement.

The rate of technological advancement and the demonstrated application of automation will continue to increase automation of DoD purchasing offices. To realize maximum benefit, procurement managers and coordinators must be active participants in the design and implementation of new procurement systems.

APPENDIX A

ACTIVITIES VISITED

Following is a list of the DoD activities where the use of automation in procurement was reviewed in the course of this study. The offices marked (phone) were contacted by telephone; all others were visited personally.

ARMY

- Materiel Development and Readness Command (DARCOM) Headquarters,
Alexandria, VA
- Missile Command, Huntsville, AL
- Armament Command, Rock Island, IL (phone)
- Forces Command (FORSCOM) Headquarters, Fort McPherson, GA
Fort Bragg, NC
- Training and Doctrine Command (TRADOC) Headquarters, Fort Monroe, VA
Fort Eustis, VA
Fort Belvoir, VA
- Corps of Engineers Headquarters, DC
ACE, Huntsville Division, AL
ACE, Portland Division, OR (phone)
- Defense Supply Service - Washington (Pentagon)

NAVY

- Naval Materiel Command
 - Naval Air Systems Command, Arlington, VA
 - Naval Sea Systems Command, Arlington, VA
 - Naval Electronic Systems Command, Arlington, VA
 - Naval Facilities Engineering Command, Alexandria, VA
 - Naval Air Development Center, Warminster, PA (phone)
- Naval Supply Systems Command, Arlington, VA
 - Aviation Supply Office, Philadelphia, PA
 - Ships Parts Control Center, Mechanicsburg, PA
 - Fleet Material Support Office, Mechanicsburg, PA
 - Naval Supply Center, Charleston, SC
 - Naval Supply Center, Oakland, CA (phone)
- Office of Naval Research, Arlington, VA
- Marine Corps Headquarters, Arlington, VA (phone)
 - Marine Corps Logistics Base, Albany, GA (phone)

AIR FORCE

- Warner Robbins Air Logistics Center, GA
- Gunter Air Force Station, AL
- Air Force Systems Command Headquarters, Andrews AFB, MD
Patrick AFB, FL
- Washington Area Contracting Center, Andrews AFB, MD
- Office of Scientific Research, Bolling AFB, MD (phone)

DEFENSE LOGISTICS AGENCY

DLA Headquarters, Cameron Station, VA
Defense Industrial Supply Center, Philadelphia, PA
Defense Personnel Support Center, Philadelphia, PA
Defense Fuel Supply Center, Cameron Station, VA

APPENDIX B

AUTOMATED PROCUREMENT STEPS

The following is a capsule summary of the steps in the procurement process which have been automated:

1. Initiation of the purchase request. For some items under automated inventory management systems, a purchase request (PR) or equivalent authorization is automatically generated when a predetermined order point is reached. For items not under automated inventory management systems, the requirement data can be entered manually and the system will then produce the purchase request and initiate other related steps described below.
2. Identification of potential sources of supply. Bidders lists are provided and can be maintained through automated techniques. The performance of bidders can be reviewed and nonbidders dropped from the list. Characteristics of bidders can be identified (small, minority, women-owned, etc.) and solicitations restricted accordingly. Mailing labels for solicitations can be produced automatically, if needed.
3. Maintenance of Procurement history. The buyer receives a summary of prior purchases, sources, and prices as an attachment to the procurement request.
4. Combination of similar requirements. Especially in the area of high use stock items, computer programs have been developed to identify and combine new requirements for the same or similar items with other requirements still in process. Also, small quantities may be held for a period of time until additional requirements bring the order to an economic level.
5. Verification of fund availability. Computer systems also can provide data needed to manage many fund accounts -- stock funds particularly -- and to ascertain that funds have been reserved for given procurements.
6. Preparation of solicitation and/or award documents. Certain procurement situations have no need for a procurement request as such. These include
 - a. Items that will cost less than \$500. Because noncompetitive procurement of such items is authorized, purchasing activities may establish blanket purchase agreements (BPAs) with suppliers of such items. There are computer systems designed to produce a delivery order under the BPA instead of a PR when reordering is necessary.

- b. Delivery orders under indefinite delivery or indefinite quantity type contracts and basic ordering agreements. When these types of contracts are used, programs can produce priced or unpriced delivery orders when a requirement is established.
- c. Items which can be purchased competitively and for which the sources of supply are known. Requests for quotation (RFQs) can be issued automatically to the potential sources.

Even when a purchase request is needed and procurement personnel must evaluate responses and select sources, the resulting solicitation and award documents can be mechanically prepared, using data entered into the computer as the PR is prepared.

An important subfunction of the preparation of solicitation and award documents which has been automated is the use of matrices which identify all standard contractual clauses required for specific types of contracts. The buyer need only specify an index number, thereby identifying all standard clauses to be included in the document.

- 7. Evaluation of reasonableness of price. Offers from competing vendors can be entered into the data base to determine the lowest evaluated price (considering discounts, freight differential, etc.), and to evaluate that price against a previously stored standard to determine its reasonableness. Automatic production of the award document can follow this evaluation process. In other situations, it may be desirable to make a partial evaluation, with the potential sources ranked according to their evaluated prices. This ranking could be used by a buyer in making the award decision.
- 8. Performance of cost analysis. For those instances when the reasonableness of price cannot be established by competition, standard programs have been developed to provide buyers and price analysts the tools for rapid performance of cost analysis. These include risk analysis, regression techniques, overhead rate analysis, and computation of negotiation objectives and positions.
- 9. Gathering and reporting procurement statistics. DoD's Procurement Management Reporting System requires preparation of an individual procurement action report for each transaction in excess of \$10,000 (DD350), and a monthly summary by procurement activity of all transactions of \$10,000 or less (DD1057). Automated systems can accumulate and report all data required by these two forms. In addition, many DoD activities have standard or intermittent demands for other statistical data on procurement actions. The capability exists to capture a wide variety of procurement statistics through automated programs.
- 10. Procurement tracking and management information systems. Comprehensive, uniquely tailored systems are available for tracking the progress of a purchase request from its initiation to award of contract. These systems can provide management data on the volume of work, aging, progress, performance against milestones, etc.

11. Updating of files. Programs can automatically update all data files which need input from the procurement process such as procurement history, finance, inventory management, due-in files, contract administration files, etc.
12. Surveillance of contract administration. Contract requirements and delivery dates are entered into the data base. The contract administrator automatically receives notice of upcoming delivery dates. Shipment and contract payment notices are generated for appropriate offices and progress and partial payments are produced at the appropriate times.

APPENDIX C

AUTOMATION IN DoD COMPONENTS

This appendix summarizes the extent of automation by DoD component and category of procurement for the activities reviewed. It also describes innovative applications. The contact points for the various systems mentioned are listed at the end.

Army

System acquisition in the Army is primarily accomplished by the Materiel Development and Readiness Command (DARCOM) through its five National Inventory Control Points (NICPs). DARCOM has recently introduced its Procurement Automated Data and Document System (PADDS) at these activities. This system interfaces with DARCOM's automated inventory management system, the Commodity Command Standard System (CCSS). Through PADDS and the CCSS interface, all of the automated steps described above except for combination of like requirements, cost analysis, or evaluation of reasonableness of price are automated. The NICPs use a time-shared system developed by the Air Force known as Copper Impact in the evaluation of major pricing proposals.

Central procurement of goods and services to support major systems is also done by the Army's NICPs using the CCSS and PADDS. Central procurement of construction work in the Army is done by the Corps of Engineers. The Corps activities are decentralized to 14 divisions and 40 district offices. There are no standard automated procurement systems and individual offices are free to develop their own applications. The Portland division office, in particular, uses automation to support its contracting function. Several offices use word processing equipment to prepare contract documents.

Base procurement in the Army is, for the most part, unautomated. DARCOM is exploring ways to adapt PADDS for use in base procurement at DARCOM installations. The 38 bases of the Forces Command (FORSCOM) and the Training and Doctrine Command (TRADOC) executed almost 1.2 million contract actions during fiscal 1981, 99 percent of which were small purchases highly suited to automated processes. Some of these bases have independently developed automated purchase capabilities beyond word processing equipment. Fort Eustis has a very comprehensive Automated Contracting System (ACONS). The Army Communications Command has also adopted ACONS. Fort Belvoir has developed a system called Q1, which has been operating (with continual improvements) since 1978. The Q1 system has been well received within TRADOC; it is now in use at six bases. FORSCOM bases have shown great interest in an Automated Procurement System (AUTOPS) developed at Fort Hood. While four bases are now using this system, its further adoption has been halted because its computer language is not on the Army's list of approved languages. Adding delay is the Army's impending procurement of new computers to support all automated base operations (project VIABLE). Although procurement is not among the operations that will be supported when these new base computers are put into service, it was widely suggested that further automation in the procurement area would be delayed until VIABLE is completed.

Navy

System acquisition in the Navy is primarily done by the three major hardware commands, the Air, Electronic, and Sea Systems Commands. Each of these commands has automated capabilities to prepare documents and to track procurement actions through their contracting offices. All three also use the Copper Impact programs to assist in proposal evaluation and analysis.

Central procurement of goods and services to support major weapon systems is done by the Aviation Supply Office (ASO) for aircraft, and by the Ships Parts Control Center (SPCC) for all other weapon systems. Both ASO and SPCC have automated small purchase systems which are a part of the Navy's Uniform Inventory Control Program (UICP). For small purchases, the system can initiate the procurement request, identify potential sources, prepare solicitation and award documents, track the progress of procurement requests, and update supply and financial records. However, the UICP computers and software are very old (over 15 years); the equipment is saturated and obsolete. Navy has a program underway to replace the UICP hardware, and then the software, but the operational readiness date is years away.

Central procurement of basic research for the Navy is done by the Office of Naval Research (ONR). This office has just introduced an automated Research and Development Management Information System (RADMIS) for tracking contract actions and has word processing equipment for drafting contractual documents.

Central procurement of construction of shore facilities for Navy is done on a decentralized basis by offices of the Naval Facilities Engineering Command (NAVFAC). While several NAVFAC technical functions are computer assisted, the contracting offices are just beginning to use word processors for contract drafting.

Base procurement for Navy is accomplished primarily by the Naval Regional Contracting Offices and the Naval Supply Centers (NSCs). The six major NSCs processed almost 400,000 small purchase transactions during fiscal 1981. At this volume of business, automated assistance becomes a virtual necessity. A prototype system, Automation of Procurement and Accounting Data Entry (APADE), was implemented at NSC Oakland, but encountered serious

problems. At present the Naval Supply Systems Command (NAVSUP) is overseeing the complete redesign of APADE. Automation is now limited to word processing equipment for contract drafting and automated management information systems.

The majority of purchase actions of the Marine Corps are base support procurements. Unique weapon and support systems are purchased by Marine Corps headquarters which has no automated purchasing capabilities. Base procurement is accomplished at eight field purchasing offices. Only one, the Marine Corps Logistics Base, Albany, Georgia, has an automated purchase system. This system provides buyers with source lists and the procurement history of the item. It can identify pending purchases of like items; it produces the purchase documents, accumulates statistics, and provides management information reports.

Air Force

System acquisition in the Air Force is performed primarily by the major hardware-oriented divisions of the Air Force Systems Command (AFSC): Aeronautical Systems Division, Electronic Systems Division, Space Division, and Armament Division. AFSC has two widely-used automated programs: Auto-preps which is used for drafting contracts and AMIS which transmits contract administration data to field offices. It also provides management information on amounts and types of contracts awarded. AFSC divisions generally use Copper Impact for proposal evaluation and analysis.

AFSC is engaged in total office automation experiments at three of its subsidiary commands. These systems would provide an integrated automated program with accounting, legal, administrative, procurement, and contract management subsystems, and include teleconferencing capabilities.

Central procurement of goods and services to support weapon systems is the responsibility of the Air Force Logistics Command and is accomplished

through five Air Logistics Centers (ALCs). These centers are highly automated. The automated purchase system (JO-23) and the acquisition and due-in system (JO-41) in use by the ALCs perform all of the automated steps described above except cost analyses and evaluating reasonableness of price. They do not currently feed contract award data into the contract administration file. The systems are limited to small purchases and orders under indefinite delivery contracts or basic ordering agreements, regardless of price. For large purchases, ALCs use only the JO-41 which tracks progress of purchase requests and updates related files.

An advanced word processing system has been developed at Hill Air Force Base, and is being used by the Air Logistics Center there to prepare contract documents. This Automated Contract Preparation System (ACPS) has helped produce enormous productivity gains, and was the subject of a presentation at the 1982 Federal Acquisition Research Symposium. Its developers anticipate that it will soon be selected for use at the other ALCs.

Central procurement of basic research for the Air Force is done by the Office of Scientific Research (OSR). This office is a part of AFSC and is involved in one of the three experimental office automation projects. At OSR, procurement is the last function scheduled to be included in the Automated Information and Documentation System (AID). There is a four-phase implementation for inclusion of procurement in AID. Phase 1 is the management information (document tracking) portion and is in place. Later phases are planned for document preparation, contract administration, and report preparation.

Base procurement in the Air Force has long been automated through a program known as Customer Integrated Automated Procurement System (CIAPS). It identifies potential sources, provides the procurement history, prepares award

documents, gathers statistics, tracks the progress of procurement workload, and updates supply files. Advances in computer technology have made the current system obsolete. It is tied to central computers which are overloaded and available to procurement only as a batch system. Updating of CIAPS is underway but is linked to a major program for replacement of base computers which will take several years to complete.

Defense Logistics Agency (DLA)

DLA does not make system acquisitions. Its procurement responsibility encompasses central procurement of certain assigned commodities and items of supply. DLA's hardware centers (Construction, Electronic, General, and Industrial) operate under a Standard Automated Materiel Management System (SAMMS) and its procurement component, the Automated Small Purchase System (SASPS). Approximately 50% of DLA's small purchases are processed through SASPS, a totally automated system which takes the requirement established by SAMMS and proceeds through solicitation and evaluation of offers to placement of the order, accumulation of purchase statistics, and updating all related files. The DLA hardware centers also use appropriate parts of SASPS for purchases which cannot be totally accomplished through the automated system.

DLA has two other major procurement responsibilities: fuel and personnel support. Through its Fuel Supply Center, DLA expends over 10% of the total DoD procurement budget. There is very little automation in this very important procurement center. At present the fuel supply center has three word processors for contract drafting and clerical needs, and an automated procurement request status control system.

DLA's personnel support procurement responsibilities fall into three product groupings: clothing and textiles, medical supplies, and subsistence.

Procurement of clothing and textiles and medical supplies is generally accomplished through SASPS. Due to the rapid turnover and perishable nature of most subsistence items, their procurement is not compatible with SASPS. The personnel support center is currently engaged in design and development of an automated system which will accommodate the unique aspects of a major subsistence procurement program.

Base support at DLA installations has recently been automated by the addition of a purchase component to DLA's Base Operations Standard System (BOSS). It automates the entire process for small purchases except that buyers must personally evaluate offers.

Innovative Applications

The most time-consuming aspect of small purchase transactions is involved in entering data by keypunch into the processing equipment. The ability to bypass manual entry of data would significantly reduce the time needed to process small purchase transactions. The capability exists to enter information into a data base by the use of optical character readers (OCR) and by voice recognition equipment. They are useful in gaining the benefits of source data automation, i.e., capturing the data in the computer as early as possible, in order to eliminate later rekeying. They are quite expensive, but the cost is declining and the capability improving.

Several activities are attempting to incorporate source data automation into their procurement process. Fort Belvoir is investigating the use of an OCR wand to input purchase request data. The Naval Sea Systems Command (NAVSEA) is using OCR equipment for an entirely different purpose. They have word processing machines, used for the normal functions: data input, editing, and printing. Faced with an increased workload, which exceeded the capacity of the existing equipment, NAVSEA purchased an optical character reader. This

allows them to use existing typewriters to type a document, an OCR to read it and store the contents in the memory of a word processor, and the word processors only for editing and printing. The Marine Corps Logistics Base at Albany, Georgia uses dictating machines to allow buyers to supply procurement data by voice. Unfortunately the data must then be accumulated and keyed into the computer as a separate operation. However, it is a step in the direction of direct voice input.

The Defense Personnel Support Center (DPSC) in Philadelphia has introduced the "Purchase by Teleprinter Technique" (PETT) for certain medical supplies. It uses teleprinters to query the automated inventory control systems of drug manufacturers or wholesalers concerning price and availability of required items and to place orders when appropriate. DPSC processes approximately 5000 requisitions for medical supplies monthly through PETT.

The Naval Facilities Engineering Command is prototyping an automated cost estimating procedure. This program will provide a data base of labor, material, and equipment amounts and costs which can be adapted to local conditions to validate bids and provide cost control during the design process.

DARCOM is developing a program to track the progress of intended acquisitions from the time the requirement is first identified. It would extend PADDS to the procurement planning process.

The Air Force Logistics Command has a fully operational system for determining personnel requirements for purchasing offices. This system, E-841, is a computer based program which determines the complexity of anticipated workload and calculates the personnel required to accomplish it. It also measures the degree of productivity being achieved by the individual Air Logistics Centers.

The Defense Industrial Supply Center (DISC) has such a high volume of purchase activity that it long ago (1960's) turned to automation as a necessity. DISC manages over 770,000 items, and processes over 5 million purchase requisitions each year. Because of its volume, DISC is able to cost justify recently developed computerized equipment that most purchasing activities would find prohibitively costly. Thus DISC uses top-of-the-line laser printers that print 7200 pages of contract documents per hour, and automatic envelope stuffers that fill and seal 4000 envelopes per hour. They have also developed an "auto-telex RFQ" system which, for certain items, will send electronic RFQs to potential suppliers. The exact form of the transmission (telex, TWX, night letter, etc.) depends on the suppliers' equipment.

An area that promises significant cost savings is the replacement of paper documents by microfiche or microfilm. The contracting operation at Hill Air Force Base is testing a procedure that replaces the contract clauses on solicitations and contracts with microfiche copies of those clauses. The hard-copy document then makes a one or two line reference to the clause, including the microfiche frame number. Preliminary estimates of savings in reproduction and postage costs are \$500,000 per year. The greatest benefit from micrographic storage will be obtained when purchasing activities are able to stop keeping paper copies of old contractual documents and supporting material. This improvement is not yet permitted by the Defense Acquisitions Regulations.

Electronic interoffice transactions are now being used on an experimental basis in some AFSC offices. When perfected, such capabilities would allow electronic entry of requirements into an automated purchasing system, thus eliminating the need for preparation and transmission of procurement requests. A related use of electronic transactions would be the payment of

contractors by electronic fund transfers. This is certainly within current technology, considering that such use for payroll purposes is commonplace.

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